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Researcher Receives $1,000 Wohlleben-Hochwalt Award

The University of Dayton *News Release*

RESEARCHER RECEIVES $1,000
WOHLLEBEN-HOCHWALT AWARD

DAYTON, Ohio, October 8, 1982 -- The University of Dayton is proud to announce that Robert A. Brockman has been awarded the 1982 Wohlleben-Hochwalt Professional Research Award. Brockman has received a $1,000 cash award for his work in the development of a practical, three-dimensional, non-linear structural analysis method--MAGNA (Materially and Geometrically Nonlinear Analysis).

The Wohlleben-Hochwalt Award is given by the University of Dayton to an individual or to a team for recognition of an outstanding research accomplishment with technical merit, high quality scientific documentation, novelty and value to the University, nation, and local community. The award was recently endowed by Carroll A. Hochwalt, a 1920 graduate of UD and the former vice president for research and development for Monsanto. While at the University of Dayton, Hochwalt was encouraged and assisted by his chemistry professor and mentor, Brother William Wohlleben, S.M., to develop a research laboratory in Dayton. In 1936 the laboratory became the central research lab of what is today the Monsanto Research Corporation.

Brockman's nonlinear analysis system is based upon a technique called a finite element method, which breaks three dimensional problems into small regions, changes in which are each measured at the region's surface. According to Brockman, "MAGNA makes it easier to consider complicated shapes. We try to turn the differential equations that govern the shape of the structure into linear algebraic equations that are more readily understood by the computer."

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Some of the nonlinear phenomena that can be analyzed with MAGNA include: large displacement stiffening and softening, plastic deformation, and strain-hardening. MAGNA offers a variety of practical applications that will allow the use of an effective method of analysis for the problem at hand. For example the computer program can analyze the design materials for various high performance products that are better, safer, and more cost efficient. MAGNA permits more ideas to be tried and tested at a much lower cost. "We have been able to save more than 90% of the cost of testing with this method," says Brockman. Hospitals have used the design to test prosthetic joints for the handicapped, and the Air Force has used the system to evaluate aircraft materials.

Although MAGNA is intended primarily for nonlinear finite element analysis, it can also perform linear static and dynamic solutions.

Brockman's engineering computer program has been used internationally, primarily in the aerospace industry.

Brockman, of the UD Research Institute Aerospace Mechanics Division, and his wife and two children reside at 4451 Powder Horn Drive in Beavercreek.